

# Notice of Allowability

Application No.

10/620,129

Examiner

THUY V. TRAN

Applicant(s)

HAUER ET AL.

Art Unit

2821

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 7/15/2003 & Interview held on 05/05/2004.
2. ☒ The allowed claim(s) is/are 1-8.
3. ☐ The drawings filed on \_\_\_\_\_ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 05052004.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 05052004.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☒ Other See Continuation Sheet.

THUY V. TRAN  
Examiner  
Art Unit: 2821.

### DETAILED ACTION

This is a response to the Applicants' filing on July 15<sup>th</sup>, 2003 and the interview held on May 5<sup>th</sup>, 2004. In virtue of this filing, claims 1-8 are currently presented in the instant application.

#### *Examiner's Amendment*

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Benjamin Hudson, Jr. on May 5<sup>th</sup>, 2004. The Examiner's amendment includes:

- **Amendment to the title:**

*Change the original title to --AN IMPROVED RF POWER CONTROL DEVICE  
FOR RF PLASMA APPLICATIONS--;*

- **Amendment to the Abstract:**

*Line 1, change "method" to --device--;*

*Line 11, change "Plasma" to --plasma--; and*

*Line 12, insert --device and-- between "control" and "methods";*

- **Amendment to the claims:**

*Claim 1, line 11, change "are" to --is--;*

*Claim 1, line 18, change "deliver" to --delivered--;*

*Claim 5, line 2, change "a" (first occurrence) to --an--;*

*Claim 5, line 11, change "are" to --is--;*

*Claim 5, line 12, change "forward and reflected signal mixers" to --a first mixer--;*

*Claim 5, line 19, insert --a-- between "to" and "second";*

*Claim 5, line 20, insert --to-- between "connected" and "the"; and replace "forward and reflected signal mixers" with --first mixer--;*

*Claim 5, line 26, change "deliver" to --delivered--; and*

*Claim 6, line 3, change "forward and reflected signal mixers" to --first mixer--;*

- **Amendment to the specification:**

*Page 3, line 16, change "10" to --10'--;*

*Page 3, line 22, change "20" to --20'--;*

*Page 3, line 23, change "22" to --22'--; change "24" to --24'--; and change "26" to --26'--;*

*Page 3, line 24, change "30" to --30'--; and change "32" to --32'--;*

*Page 4, line 16, change "30, 32" to --30', 32'--;*

- **Amendment to the drawings:**

*In FIGURE 2:*

*Change "10" to --10'--;*

*Change "18" to --output to matching network and plasma--;*

*Change "20" to --20'--;*

*Change "22" to --22'--;*

*Change "24" to --24'--;*

*Change "26" to --26'--;*

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*Change "30" to --30'--;*

*Change "32" to --32'--;*

*In FIGURE 3:*

*Change "output" to --output to matching network and plasma--; and*

*In FIGURE 4:*

*Change "output" to --output to matching network and plasma--;*

*Insert "REFL" on the opposite side of "FWD".*

***Allowable Subject Matter***

2. Claims 1-8 are allowed.

***Reasons for Allowance***

3. The following is an examiner's statement of reasons for allowance:

Prior art fails to disclose or fairly suggest:

- A VHF generator for delivering RF power to a plasma comprising (1) each of the sampled forward and reflected signals is connected to mixers for mixing with an intermediate frequency of an oscillator, (2) the mixed forward and reflected signals are passed through low-pass filters, (3) the filtered forward and reflected signals are connected to amplifiers and detectors, and (4) the detected forward and reflected signals are fed back to a power control circuit wherein the power delivered to the plasma is monitored without interference from spurious frequency signals generated by the plasma, in combination with the remaining claimed limitations as called for in independent claim 1 (claims 2-4 are allowed since they are dependent on claim 1);  
and

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- A VHF generator for delivering RF power to a plasma comprising (1) a first oscillator connected to a second mixer for mixing a sampled output of the variable RF signal generator with a first intermediate frequency, (2) the output of the second mixer is connected to a first band pass filter and then connected to a third mixer for mixing with a second intermediate frequency of a second oscillator, (3) the output of the third mixer is connected to a second band-pass filter and connected to the first mixer, (4) the mixed forward and reflected signals are passed through low pass filters, (5) the filtered forward and reflected signals are connected to amplifiers and detectors, and (6) the detected forward and reflected signals are fed back to a power control circuit wherein the power delivered to the plasma is monitored without interference from spurious frequency signals generated by the plasma, in combination with the remaining claimed limitations as called for in independent claim 5 (claims 6-8 are allowed since they are dependent on claim 5).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Citation of relevant prior art***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Prior art Reyzelman et al. (U.S. Patent No. 6,703,080) discloses a method and apparatus for VHF plasma.

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Prior art Chen et al. (U.S. Patent No. 6,472,822) discloses a pulsed RF power delivery for plasma processing.

Prior art Wilbur (U.S. Patent No. 6,020,794) discloses an RF plasma system.

Prior art Turner et al. (U.S. Patent No. 5,939,886) discloses a plasma monitoring and control method and system.

Prior art Barnes et al. (U.S. Patent No. 5,892,198) discloses a method and apparatus for controlling RF plasma processor.

Prior art Benjmin et al. (U.S. Patent No. 5,708,250) discloses an RF plasma processor.

Prior art Mavretic et al. (U.S. Patent No. 5,654,679) discloses an apparatus for matching a variable load impedance with an RF power generator impedance.

### ***Inquiry***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THUY V. TRAN whose telephone number is (571) 272-1828.

The examiner can normally be reached on M-F (8:30 AM-6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DON K. WONG can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

THUY V. TRAN

Examiner

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T.T.  
05/05/2004

